Art. VI.—*On some Facts in the Geographical Distribution of Land and Fresh-water Vertebrates in Victoria.*

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[Read 8th July, 1896.]

A part of this paper was prepared for the Melbourne meeting of the Australasian Association for the Advancement of Science, 1890, and was read before the Biological Section. As, at that time, certain orders, the Lizards and Batrachians, had not been carefully studied, it seemed better to defer publication until the facts of distribution of these orders had been ascertained. I have since published in the Proceedings of this Society a Census of Victorian Batrachians (1891), and also, in conjunction with Mr. Frost, a Monograph of the Victorian Lizards (1893). I am accordingly now able to present a more complete account of the general features of the geographical distribution of Victorian Land and Fresh-water Vertebrates.

Limited as is its area, the colony of Victoria comprises in its territory a great variety of country. The grass plains of the north, the mallee scrub of the north-west, the rich undulating grazing country of the Western District, the Alps of the North-East, the moist forests of Gippsland, and the Southern District which surrounds Port Phillip, lying between the Otway Ranges and Wilson's Promontory, and comprising but slightly elevated country with moors and swamps and lightly timbered areas, constitute some half dozen well-marked natural divisions. For years Baron von Mueller has been indefatigable in collecting precise records of the occurrence of our native plants in all parts of the colony (as indeed of all parts of our continent), and in his "Key to the System of Victorian Plants" he has published a table of their distribution. The regions which he adopts as a result of his knowledge of the flora are the same as those

indicated, except that he combines in one the Mallee and the Murray Plains.

While Victoria thus possesses provinces which are sufficiently distinct from one another in their geographical and botanical features, these are in most instances physically continuous with adjacent regions of the neighbouring colonies. Thus the northern plains form but a part of the great Central Murray basin, the Mallee and Western District are only separated by an imaginary meridian from South Australia, and the Alpine and East Gippsland regions merge in the mountain and coast regions of New South Wales, and thus form an extension of the eastern strip of our continent.

We have no such complete and definite information as to the local distribution of animals as the Baron has secured of that of the plants. Animals, especially the higher forms, are more difficult to obtain and to preserve than plants. In this regard the need is felt of local museums in each of the provinces in which examples from as many localities as possible might be preserved and be available for the aid of students of distribution and variation. This is especially desirable in the case of the Vertebrates, which are so liable to compulsory migrations or local extinction on the advent of civilised man.

In this paper I have attempted, as far as is possible in the present state of our knowledge, to tabulate the distribution of Victorian Vertebrates, omitting birds, and to discuss the summarised facts. I have made use of all precise records in Gould, the British Museum catalogues, the Victorian National Museum, and Professor McCoy's "Prodromus of Victorian Zoology," and of a large number of private and personal collections. Mr. D. LeSouef gave me very valuable information on the distribution of the mammals. For purposes of comparison the distribution of Tasmanian forms is included as far as known with precision. In the Mammalian table, "T," in the first column, stands for Tasmania, the other columns giving the distribution in Victoria.

MAMMALIA.

CHIROPTERA.

	T.	S.	S.W.	N.W.	N.E.	E.
A. Frugivora.						
Pteropus.						
P. poliocephalus, Temm.				x		x
B. Insectivora.						
Nyctinomus.						
(= *Molossus* of Gray)						
N. australis, Gray		x				
N. plicatus, Buch.-Ham.	x					
Chalinolobus.						
C. tuberculatus, Forster	x	x				
C. gouldi, Gray	x	x				
Nyctophilus.						
N. timoriensis, Geoffroy	x	x				
Vesperugo.						
V. pumilus, Gray*	x					
V. kreffti, Peters	x					

The Victorian Bats have not been thoroughly collected or studied. Bats, too, as winged animals with considerable powers of flight would be capable of being carried with ease over such barriers as the Dividing Range or Bass's Straits. Wallace states that two small species of North American bats occasionally reach Bermuda, a distance of at least 700 miles. *Nyctinomus australis* occurs in New Guinea, *N. plicatus* in India, and *Nyctophilus timoriensis* all over Australia and in the Malay Archipelago. We cannot conclude much from our table then, except that we may probably consider that the conspicuous absence of Fruit Bats from Tasmanian orchards is due in parts to the lower temperatures of the southern island.

* Said to occur all over Australia.

RODENTIA.

	T.	S.	S.W.	N.W.	N.E.	E.
MURIDÆ.						
MUS.						
M. novæ-hollandiæ, Waterh.				x		
M. tetragonurus, Hig. & Pet.	x					
M. pachyurus, H. & P.	x					
M. castaneus, H. & P.	x					
M. tamarensis, H. & P.	x					
M. velutinus, Thomas	x					
M. setifer, Horsfield	x					
M. fuscipes, Waterh.	x					
M. griseo-coeruleus, H. & P.	x					
M. leucopus, H. & P.	x					
M. variabilis, H. & P.	x					
M. simsoni, H. & P.	x					
M. penicillatus, Gould	x					
HYDROMYS.						
H. chrysogaster, Geoff.	x	x		x		
MASTACOMYS.						
M. fuscus, Thomas	x					
HAPALOTIS.						
(= *Conilurus*, Og.)						
H. conditor, Gould				x		
H. mitchelli, Ogilby				x		
H. apicalis, Gould				x		
H. albipes, Licht.				x		

Here we are at once struck with the restriction of *Hapalotis* to the northern parts of Victoria. The moister climates of Southern and Eastern Victoria and of Tasmania are unfavourable to the genus. *Mastacomys* has been met with in Central Australia (Horn Expedition) and in the fossil state in New South Wales. *Hydromys* is widely spread over Australia. The species of *Mus* clearly need more attention. If the Tasmanian species enumerated all hold good, it would be a very remarkable thing if a large number of them should not also occur in Victoria. That the Victorian mice have been so far pretty much neglected must indeed be freely admitted.

CARNIVORA.

	T.	S.	S.W.	N.W.	N.E.	E.
CANIDÆ.						
CANIS.						
C. dingo, Blum.		x	x	x	x	x

I suppose there is but little doubt that the Dingo is a comparatively late arrival in Australia. The Bass Straits were very much as they are at present, and the Dingo had no means, or need, of crossing them. On the mainland his rivals, the Thylacine and the Tasmanian Devil, early became extinct before him. They have survived in Tasmania, though the progress of the white man threatens their extinction.

MARSUPIALIA.

DASYURIDÆ.

	T.	S.	S.W.	N.W.	N.E.	E.
PHASCOLOGALE.						
P. flavipes, Waterh. (var. *typica*, B.M.C.)		x		x		
P. calura, Gould				x		
P. penicillata, Shaw		x	x	x	x	x
P. swainsoni, Waterh.	x	x				
P. minima, Geoffr.	x					
SMINTHOPSIS.						
S. murina, Waterh.			x	x		
S. leucopus, Gray	x	x				
S. crassicaudata, Gould		x	x			
ANTECHINOMYS.						
A. lanigera, Gould				x		
DASYURUS.						
D. geoffroyi, Gould				x		
D. viverrinus, Shaw	x	x	x	x	x	x
D. maculatus, Shaw	x	x			x	
THYLACINUS.						
T. cynocephalus, Fischer	x					
SARCOPHILUS.						
S. ursinus, F. Cuv.	x					

Among the Dasyurids we may note the restriction of *Phascologale calura*, *Sminthopsis murina*, *Antechinomys lanigera* and *Dasyurus geoffroyi* to N.W. Victoria, and the restriction of *Phascologale minima*, *Thylacinus cynocephalus* and *Sarcophilus ursinus* to Tasmania; the former apparently due to the climatic (especially, as has been suggested by Professor Spencer, probably the hygrometric) barrier, and the latter to the absence of the dingo, while we have already alluded to the influence of the absence of the dingo on the perpetuation of the larger Tasmanian carnivorous marsupials in Tasmania. Further, while *Phascologale flavipes* and the more widely distributed *P. penicillata* occur in North and in South Victoria, *P. swainsoni* and *Sminthopsis leucopus* and *Dasyurus maculatus* are found in Tasmania and only the moister districts of Victoria.

PERAMELIDÆ.

	T.	S.	S.W.	N.W.	N.E.	E.
PERAMELES.						
P. obesula, Shaw	x	x				
P. nasuta, Geoff.		x				
P. gunnii, Gray	x	x	x	x		
P. bougainvilii, Quoy & Gaim. var. *fasciata*, Gray				x		
CHÆROPUS.						
C. castanotis, Gray				x		

Thus *Perameles fasciata* and *Chœropus castanotis* are confined to the less humid part of Victoria, where *P. obesula* is wanting, though it occurs in Tasmania and Southern Victoria.

PHALANGERIDÆ.

	T.	S.	S.W.	N.W.	N.E.	E.
PHASCOLARCTUS.						
P. cinereus, Goldfuss		x	x	x	x	x
PHALANGISTA.						
Trichosurus.						
T. vulpecula, Kerr		x	x	x	x	x
var. *fuliginosus*, Og.	x					
T. caninus, Ogilby					x	x
Pseudochirus.						
P. cooki, Desm.	x	x	x		x	x
P. peregrinus, Bodd.		x				
DROMICIA.						
D. lepida, Oldfield Thomas	x					
D. nana, Desm.	x	x				
PETAUROIDES.						
(= Petaurista, Desm.)						
P. taguanoides, Desm.						
(= *volans*, var. *typica*, Thomas)		x	x	x		
PETAURUS.						
(= *Belideus*)						
P. breviceps, Waterh.				x	x	x
P. australis, Shaw						x
P. sciureus, Shaw		x				
GYMNOBELIDEUS.						
G. leadbeateri, McCoy		x				
ACROBATES.						
A. pygmæus, Shaw		x				

PHASCOLOMYIDÆ.

	T.	S.	S.W.	N.W.	N.E.	E.
PHASCOLOMYS.						
P. ursinus, Shaw	x					
P. mitchelli, Owen		x	x	x		

Tasmania is distinctly weaker in *Phalangeridæ*. The absence of *Phascolarctus* is very marked. There are no peculiar North Victorian forms in these two families. This distribution agrees well with the nearly total absence of the forest-loving *Phalangeridæ* from Central Australia (Horn Expedition).

MACROPODIDÆ.

	T.	S.	S.W.	N.W.	N.E.	E.
MACROPUS.						
M. giganteus, Zimm.		x	x	x	x	x
var. *fuliginosus*, Desm.	x			x		
var. *melanops*, Gould				x		
M. robustus, Gould				x		
M. rufus, Desm.				x		
M. ualabatus, L. & G.						
typicus, Thomas		x				x
M. ruficollis, Desm.						
var. *typicus*, Thomas		x				
var. *bennettii*, Waterh.	x	x				x
M. thetidis, Less.						x
ONYCHOGALE.						
O. frænata, Gould				x		
O. lunata, Gould				x		
LAGORCHESTES.						
L. leporoides, Gould				x		
PETROGALE.						
P. penicillata, Gray		x				
BETTONGIA.						
B. cuniculus, Og.	x	x				
B. penicillata, Gray		x				
POTOROUS.						
P. tridactylus, Kerr						
= *P apicalis*, Gould	x					
= *P. rufus*, H. & P.		x				

The northern group of *Macropodidæ* is very marked, consisting of *M. rufus*, *M. robustus*, *Onychogale fraenata* and *O. lunata*, and *Lagorchestes leporoides*. The Tasmanian forms are few in number but are all closely allied to those of Southern Victoria.

MONOTREMATA.

	T.	S.	S.W.	N.W.	N.E.	E.
ECHIDNIDÆ.						
ECHIDNA.						
E. aculeata, Shaw		x	x	x	x	x
var. *setosa*, Cuv.	x					
ORNITHORHYNCHIDÆ.						
ORNITHORHYNCHUS.						
O. anatinus, Shaw	x	x			x	x

REPTILIA.

CHELONIA.

	T.	S. & E.	N. & W.
CHELYDIDÆ.			
EMYDURA (CHELYMYS).			
E. macquaria, Cuv.			x
CHELODINA.			
C. longicollis, Shaw		x	x

Neither of these Chelonians seems to have reached Tasmania. *Emydura macquaria* does not appear to be an inhabitant of Coastal New South Wales or South-East Victoria, while *Chelodina longicollis* occurs freely on both sides of the mountain chain in both colonies.

OPHIDIA.

	T.	S. & E.	N. & W.
TYPHLOPIDÆ.			
TYPHLOPS.			
T. bicolor, Peters		x	
T. polygrammicus, Schleg.			x
T. bi-tuberculatus, Peters			x
DENDROPHIDÆ.			
DENDROPHIS.			
D. punctulata, Gray			x
PYTHONIDÆ.			
MORELIA.			
M. variegata, Gray			x
M. spilotes			x
ELAPIDÆ.			
DIEMENIA.			
D. superciliosa, Fischer	?	x	x
D. microlepidota, McCoy			x
D. aspidorhyncha, McCoy			x
D. reticulata, Gray			x
PSEUDONAJA.			
P. nuchalis, Günth.			x
PSEUDECHIS.			
P. porphyriacus, Shaw		x	x
P. australis, Gray			x
FURINA.			
F. bicucullata, McCoy			x
HOPLOCEPHALUS.			
H. curtus, Schl.	x	x	x
H. superbus, Günth.	x	x	
H. flagellum, McCoy	x	x	
H. coronoides, Günther	x	x	
H. signatus, Jan.		x	
VERMICELLA.			
V. annulata, Gray			x
ACANTHOPHIS.			
A. antarctica, Shaw			x

In summaries of this sort, while we may make use of numbers, we are very far from being able to obtain in accurate numerical terms the relations which the compared regions bear to one another. The number of species which are common to two regions may be the same as that for two other regions, but, if the former are species abounding in individuals while the latter are rare forms, it is plain that the latter relationship points to a more ancient continuity than the former. Inaccuracy in report of single or infrequent occurrences may greatly affect numerical statistics. There is always a margin of doubtful cases which we cannot altogether exclude, and cannot put into the same category with well-authenticated or especially with well-known species. Numbers then can do little more than indicate the general trend of the evidence.

Of the harmless snakes there are no Tasmanian records, but in Victoria there are Blind Snakes, Green Tree Snakes and Carpet Snakes. Of the Blind Snakes *Typhlops polygrammicus* is common in the warm, drier, northern parts of the colony. Krefft mentions *T. bicolor* as being found near Melbourne, but it is certainly uncommon.

The Tree Snake, *Dendrophis punctulata*, is in Victoria confined to the northern area, where it is tolerably plentiful. The Carpet Snake, *Morelia variegata*, is not met with south of the Divide, but becomes common toward the Murray border. It occurs in all parts of Australia, except in South Victoria and the adjacent coast district of New South Wales. Krefft records the allied Diamond Snake of New South Wales, *M. spilotes*,* from the Murray district of Victoria.

Speaking generally then, the harmless snakes are characteristic of the northern, and are but rare visitors of the southern, parts of Victoria. Of the venomous snakes, *Furina*, *Vermicella* and *Acanthopsis* are northern genera exclusively.

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* *M. variegatus* and *M. spilotes* are united in the B.M. Catalogue.

LACERTILIA.

	T.	S. & E.	N. & W.
GECKONIDÆ.			
GYMNODACTYLUS.			
G. miliusii, Bory.			x
PHYLLODACTYLUS.			
P. marmoratus, Gray			x
DIPLODACTYLUS.			
D. strophurus, D. & B.			x
D. vittatus, Gray			x
D. tessellatus, Günth.			x
GEHYRA.			
G. variegata, D. & B.			x
PYGOPODIDÆ.			
PYGOPUS.			
P. lepidotus, Lac.	x	x	x
DELMA.			
D. fraseri, Gray		x	x
D. impar, Fischer		x	x
APRASIA.			
A. pulchella, Gray		x*	x*
LIALIS.			
L. burtonii, Gray			x
AGAMIDÆ.			
AMPHIBOLURUS.			
A. adelaidensis, Gray	x (var.)		x
A. pictus, Peters			x
A. angulifer, Gray	x	x	
A. muricatus, White	x	x	x
A. barbatus, Cuv.	x	x	x
TYMPANOCRYPTIS.			
T. lineata, Peters		x	x
PHYSIGNATHUS.			
P. lesueurii, Gray		x	
VARANIDÆ.			
VARANUS.			
V. varius, Shaw		x	x
V. gouldii, Gray			x
SCINCIDÆ.			
EGERNIA.			
E. whitii, Lacép.	x	x	x
E. striolata, Peters		x	x
E. cunninghami, Gray		x	x

* Portland.

	T.	S. & E.	N. & W.
TRACHYSAURUS.			
T. rugosus, Gray			x
TILIQUA.			
T. scincoides, White	x	x	x
T. nigro-lutea, Gray	x	x	x*
T. occipitalis, Peters			x
HINULIA (LYGOSOMA).			
H. lesueurii, D. & B.		x	x
H. tæniolata, White		x	
H. quoyi, D. & B.		x	x
LIOLEPISMA (LYGOSOMA)			
L. mustelinum, O'Sh.		x	
L. entrecasteauxii, D. & B.	x	x	
L. trilineatum, Gray	x	x	x
L. metallicum, O'Sh.	x	x	
L. guichenoti, D. & B.		x	x
L. pretiosum, O'Sh.	x	x	
L. ocellatum, Gray	x		
K. tetradactylum, O'Sh.			x
EMOA (LYGOSOMA)			
E. spenceri, L. & F.		x	
HOMOLEPIDA (LYGOSOMA)			
H. casuarinæ, D. & B.	x		
HEMIERGIS (LYGOSOMA)			
H. peronii, Fitzing		x	
H. decresiensis, Gray		x	
SIAPHOS (LYGOSOMA).			
S. maccoyi, L. & F.		x	x†
RHODONA (LYGOSOMA).			
R. bougainvillii, Gray		x	x
R. punctato-vittata, Günth.			x
ABLEPHARUS.			
A. boutonii, Desjard.			x
A. lineo-ocellatus, D. & B.		x	x
A. greyi, Gray			x
A. rhodonoides, L. & F. (M.S.)			x

* Grampians. † Goulburn Valley.

The table discloses the interesting fact that the Geckos are apparently altogether absent from Tasmania, and the forests of south-east Victoria, while they abound in the drier interior. Other forms restricted to the north-west are *Lialis*, *Amphibolurus pictus*, *Varanus gouldii*, *Trachysaurus*, *Tiliqua occipitalis*, *Rhodona punctato-vittata*, and *Ablepharus boutonii*, and *A. greyi*. The Tasmanian Lizards are of much fewer species than the Victorian, but they are of South Victorian alliances, comprising a rather marked subsection of *Amphibolurus*, and a number of the skinks with a transparent disk in the lower eyelid. *Homolepida casuarinæ* probably occurs or has occurred in East Gippsland, as it is found in Coastal New South Wales.

AMPHIBIA.

	T.	S.	S.W.	N.W.	N.E.	E.
CYSTIGNATHIDÆ.						
LIMNODYNASTES.						
L. peronii, Günth.	x	x				
L. tasmaniensis, Günth.	x	x	x	x		
L. dorsalis, Gray		x				
CRINIA.						
C. signifera, Girard		x	x			
C. tasmanienesis, Günth.	x					
C. lævis, Günth.	x					
C. victoriana, Boulgr.		x				
C. froggatti, Fletcher		x	x	x		x
HELEIOPORUS.						
H. pictus, Peters		x		x		
BUFONIDÆ.						
PSEUDOPHRYNE.						
P. bibronii, Günth.		x	x	x		
P. semimarmorata, Lucas		x				
P. dendyi, Lucas					x	
HYLIDÆ.						
HYLA.						
H. aurea, Lesson	x	x				
H. peronii, Bibron	x			x		
H. parvidens, Peters		?				
H. ewingii, D. & B.	x	x	x			
H. lesueurii, D. & B.					x	

In the Census of Victorian Frogs, P.R.S.V., 1891, I included *Heleioporus albopunctatus.* This was an error. The specimens on which the inclusion was based proved to be very old and large individuals of *Limnodynastes dorsalis.*

I am inclined to suspect that all the smooth Crinias of Victoria and Tasmania are varieties of but one species.

There does not seem to be in Victoria the marked distinction between the interior and coast forms of Batrachians which Mr. Fletcher has pointed out in the New South Wales species. Certainly the drier conditions of inland New South Wales are much severer than those of inland Victoria. The frogs of Northern Victoria, too, it must be admitted are not sufficiently known.

The most striking fact brought out by the table is the absence of *Heleioporus* and *Pseudophryne* (as far as is known) from Tasmania.

PISCES.

	T.	S.V.	N.V.
PERCIDÆ.			
LATES.			
L. colonorum, Günth.	x	x	
L. similis, Castelnau		x	
L. antarcticus, Cast.		x	
L. victoriæ, Cast.		x	
MICROPERCA.			
M. tasmaniæ, Johnston	x		
M. yarræ, Cast.		x	
OLIGORUS.			
O. macquariensis, C. & V.			x
O. mitchelli, Cast.			x
CTENOLATES.			
C. auratus, Cast.			x
C. chrystyi, Cast.			x
PRISTIPOMATIDÆ.			
THERAPON.			
T. niger, Cast.			x
T. richardsoni, Cast.			x
MURRAYIA.			
M. guntheri, Cast.			x
M. cyprinoides, Cast.			x

	T.	SV..	N.V.
M. bramoides, Cast.			x
M. riverina, Krefft			x
RIVERINA.			
R. fluviatilis, Cast.			x
SPARIDÆ.			
GIRELLA.			
G. tricuspidata, C. & V.	x	x	
G. simplex, Richardson	x	x	
G. blackii, Cast.		x	
CHRYSOPHRYS.			
C. australis, Günth.	x	x	
TRACHINIDÆ.			
APHRITIS.			
A. urvillii, C. & V.	x	?	
A. bassi, Cast.		x	
MUGILIDÆ.			
AGONOSTOMA.			
A. diemensis, Rich.	x	x	
A. lacustris, Cast.	x*	x	
GADOPSIDÆ.			
GADOPSIS.			
G. marmoratus, Rich.	x	x	x†
G. gibbosus, McCoy	Similar	x	
G. gracilis, McCoy	Varieties	x	
SILURIDÆ.			
COPIDOGLANIS.			
C. tandanus, Mitchell			x 3 Varieties
HAPLOCHITONIDÆ.			
PROTOTROCTES.			
P. maræna, Günth.	x	x	
GALAXIDÆ.			
GALAXIAS.			
G. truttaceus, C. & V.	x	x	
G. attenuatus, Jenyns	x	x	
G. ocellatus, McCoy		x	
G. auratus, Johnston	x		
G. cylindricus, Cast.		x	
G. delicatulus, Cast.		x	
G. weedoni, Johnst.	x		

* King Island. † Small in upper reaches.

	T.	S.V.	N.V.
G. atkinsoni, Johnst. - - -	x		
G. amoenus, Cast. - - - -		x	
G. versicolor, Cast. - - - -		x	
G. ornatus, Cast. - - - -		x	
G. nigothoruk, Lucas - - -		x	
CYPRINIDÆ.			
NEO-CARASSIUS.			
N. ventricosus, Cast. - - -		x	
CLUPEIDÆ.			
CHATOESSUS.			
C. richardsoni, Cast. - - -			x
MURÆNIDÆ.			
ANGUILLA.			
A. australis, Rich. - - - -	x	x	
A. reinhardtii, Cast. - - -		x	
PETROMYZONTIDÆ.			
MORDACIA.			
M. mordax, Rich. - - - -	x	x	
GEOTRIA.			
G. allporti, Günth. - - - -	x		
G. australis, Gray - - - -		x	

Professor McCoy, in his "Prodromus of Victorian Zoology," long ago pointed out the remarkable distinctness between the fishes of the rivers which flow into the Bass Straits and those of the rivers of the Murray system.

The absence of *Gadopsis* from the northern rivers of Victoria may be due to the presence of *Oligorus*. Young individuals occur in the upper reaches in which *Oligorus* does not, and the introduction of the Murray Cod into the Yarra since 1857, has practically destroyed the Blackfish in that river.

The close correspondence of the South Victorian and Tasmanian genera, often species, will be obvious from the table. In the case of *Galaxias* almost every local stream or lake has its own varieties. A similar variation has been noticed by Macleay and by Ogilby in the New South Wales species of *Galaxias*.

GENERAL CONCLUSIONS.

Ever since it was formed, or existed in anything like its present condition, Bass Straits must have presented a very formidable mechanical barrier to the passage of all land and fresh-water Vertebrates unfurnished with wings. On the other hand, seeing the exceedingly wide continental distribution of such slow-travelling animals as *Trichosurus vulpecula*, *Trachysaurus rugosus*, *Egernia whitii*, *Lialis burtonii*, it seems plain that the Dividing Range in its present state cannot have acted at all as a serious mechanical barrier. But the Dividing Range has been felt in its action on the rainfall. Widely divergent climatic conditions have thus been produced, yielding a humid region in the south-east and a dry region in the north-west. Where the nature of the soil was favourable great forests have flourished, as in Gippsland and in south-west Tasmania. Thus in the one district we have excess of moisture and abundant shade, and in the other lack of moisture and consequent excess of sunshine by day and of radiation by night, all potent factors in animal life. Hence two faunas suited to the two regions. Where this barrier is most perfect the separation of the districts is most sharply marked; in the west, where it gradually disappears, the faunas merge to some extent, but as the presence of the range intensifies the humid conditions on the coast side, there is less mingling of forms than might at first have been expected.

As we have seen from the tables, the characteristic assemblage of animals of the drier area comprises the Jerboa-Rats (*Hapalotis*) among the Rodents; the Jerboa Pouched Mouse (*Antechinomys*), two other Pouched Mice (*Phascologale calura* and *Sminthopsis murina*), and Geoffroy's, or the Black-tailed, Native Cat (*Dasyurus geoffroyi*); the Striped Bandicoot (*Perameles bougainvillii*, var. *fasciata*) and the Pig-footed Bandicoot (*Chœropus castanotis*); the Wallaroo (*Macropus robustus*) and Great Red Kangaroo (*M. rufus*), the Hare Wallaby (*Lagorchestes leporoides*), and the Bridled Wallabies (*Onychogale frenata* and *O. lunata*) among the Marsupials; the Murray Tortoise (*Emydura macquaria*); the Blind Snakes (*Typhlops*), Tree Snake (*Dendrophis*), and the two Pythons, the Carpet Snake (*Morelia variegata*) and Diamond Snake (*M. spilotes*), and among venomous snakes the genera

Furina, *Vermicella* (Ringed Snake), and *Acanthophis* (Death Adder); half-a-dozen kinds of Gecko (of genera *Gymnodactylus*, *Phyllodactylus*, *Diplodactylus*, and *Gehyra*); the snake-like Lizards (*Aprasia*, *Lialis*); *Amphibolurus pictus*; Gould's Monitor (*Varanus gouldii*); the Stump Tailed Lizard (*Trachysaurus rugosus*), and Western Blue Tongued Lizard (*Tiliqua occipitalis*) with a few smaller forms; and lastly the assemblage of fishes of the Murray basin, of the genera *Oligorus*, *Ctenolates*, *Therapon*, *Murrayia*, *Riverina*, *Copidoglanis* and *Chatoëssus*, known as Murray Cod, Murray Perch, Murray Bream, Murray Catfish, etc.

While the number of species in Tasmania is always much smaller than the number in southern Victoria in all the groups except the Fish and perhaps the Mice, the two faunas present a very similar facies. Thus every genus of Marsupial, Reptile, Amphibian, and Fish which is represented in Tasmania, except *Thylacinus* and *Sarcophilus* is met with in southern Victoria. *Thylacinus* and *Sarcophilus* did live on the continent, but have been exterminated by the Dingo. Even the Tasmanian species* are in most cases identical with those of the adjacent portion of Victoria.

The fresh-water and forest forms are characteristically similar in the two regions. The fish scarcely show more than varietal differences. The common genera are *Lates*, *Microperca*, *Girella*, *Chrysophrys*, *Aphritis*, *Agonostoma*, *Gadopsis* (Blackfish), *Prototroctes* (Yarra Herring), *Galaxias* (Mountain Trout), *Anguilla* (Eel), and *Mordacia* and *Geotria* (Lampreys). Professor McCoy pointed out in his Prodromus how absolutely distinct this assemblage is from that of the Murray basin. Mr. R. M. Johnston's "Census of Tasmanian Fish" has enabled us to see how the fish of Tasmania are almost identical with those of Southern Victoria. If, as I have long believed, the Tasmanian Crinias are not separable from the smooth Victorian species with tiny vomerine teeth, then the resemblance of the amphibians of the two regions is as close as that of the fish. Amongst the forest-frequenters the mammals are most prominent and most important. The great Grey Kangaroo, Forester *par excellence*, the Scrub Wallabies

* See Professor Spencer's Address to the Biological Section of the A.A.A.S., Hobart, 1892, for a detailed account of the Tasmanian Fauna.

(*M. ualabatus* and *M. billardieri*) and the Thylacine ranged in the high woods of both regions. The two native cats, the common and the ring-tailed Opossums, and the two Dormouse Opossums (*Dromicia*) are the representatives in Tasmania of an arboreal fauna which is much more strongly developed in South Victoria and Eastern Australia. The Flying Opossums and the Koala, most specialised of all for life among the trees, are wanting altogether in Tasmania. With the exception of the common Opossum, a most enterprising and versatile animal,* the Tasmanian forest forms are absent from north-west Victoria.

From the zoological facts we are able to arrive at some definite conclusions as to the relative age of the two barriers, the Bass Straits and the Dividing Range. The marked distinctness, frequently extending to the genera, of the faunas of the north-west plains and the well-watered south-east hill and coast country points to the long persistence and ancient origin of the Dividing Range. So, going on the zoological evidence only, it seems clear that the Bass Straits were formed sufficiently to serve as an effective barrier *before* the dingo and the most highly differentiated tree-forms had reached southern Victoria, and *after* the forests had been established and the streams stocked with the existing fish, *long after* the separation or evolution of the two Victorian faunas had taken place. During the process of widening and deepening of the Straits, the dingo invaded Victoria, the Thylacine and Tasmanian Devil disappeared, while the Koala and the beautiful Flying Opossums came in from the north along the eastern strip of Australia, and took possession of the Gippsland forests along with a less desirable immigration of the Fruit-eating Bats, and, speaking generally, the present distribution of Vertebrates in Victoria has been effected.

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* In Kent Island this animal has in the total absence of trees taken to the ground and lives among the grass tussocks.